IDAS Software Modules - Description

Relex's Studio (http://www.relex.com)

Enterprise Edition (NASA KSC is at this level, the most comprehensive and powerful)

- Allow multiple users to work in the same project at the same time
- Web-enabled FRACAS and FMEA interfaces
- Secure log-in and role-based administration
- Support for ALERT and AUDIT services
- Active Directory support
- Extendable to allow unlimited number of users
- Customer-supplied MS-SQL or Oracle database

Reliability Prediction Analysis

- Predict Reliability/MTBF of electro-mechanical systems based on a bill of materials
- Models available: MIL-HDBK-217, Telcordia, PRISM, 217Plus, NSWC-98/LE1 Mechanical, 299B, IEC-TR-62380, HRD5, NPRD, EPRD, Software Reliability
- Industry-leading parts libraries
    - Largest out-of-box part libraries in the industry
    - Auto-create stackable user-defined libraries
    - Leverage FRACAS and other field data
- Support for: Derating analysis, Vendor-supplied test/failure data, complex Mission Profiles, Allocations, Configuration support
- Integrated with FMEA, RBD, OpSim, Fault Tree, LCC, Maintainability, FRACAS, and Weibull

Reliability Block Diagram (RBD)

- System-level Availability and Reliability block diagram modeling to account for redundancy and non-exponential failure distributions
- Exact Analytic or Monte Carlo simulated results
- Unlimited layers of diagram nesting
- Multiple mission phase support
- Drag-and-drop integration with Reliability Prediction
- Integrated with Reliability Prediction, Weibull, and FMEA

FMEA/FMECA

- Qualitative/quantitative risk analysis to identify single-point failures and critical failure modes
- Supports all common FMEA standards including MIL-STD-1629 Tasks, AIAG3, Automotive RPN calculations, Medical Device, Airbus, custom formats
- Excel-like look and feel with roll-up/build-down automation and auto-population intelligence
- Increase FMEA value and reduce analysis time
    - Share FMEA data between projects – re-use of lessons learned and previous analyses
    - Standardization - Effectively compare designs and streamline processes
- Web-enabled (Corporate/Enterprise Editions)
- Includes industry-accepted and user-definable FMEA libraries
- Integrated with Reliability Prediction, Fault Tree, RBD, and FRACAS

Fault Tree / Event Tree

- Graphical qualitative/quantitative risk analysis to identify paths and combinations of events that lead up to a top/undesired event
- Intuitive logic tree diagramming for qualitative/quantitative risk analysis
- Calculate probabilities and rates of occurrence of top/undesired events and failure paths / cut-sets
- Supports time-dependent and Lambda Tau calculation types
- Generate first-pass Fault Tree from FMEA
- Integrated with Reliability Prediction, FMEA, and Markov

IDAS Software Modules - Description

Maintainability Prediction

- Analyze system-level Repairability and Maintainability on electro-mechanical systems through predicting MTTR & MMH times
- Support for MIL-HDBK-472 and custom formats
- Includes industry-accepted and user-definable Task libraries
- Integrated with Reliability Prediction, RBD, and Fault Tree

OpSim (Upgraded RBD)

- Includes all RBD functionality + support for on-site & off-site sparing and periodic maintenance as well as optimization of spares and scheduled maintenance intervals
- Generates Total Cost of Ownership
- Integrated with Reliability Prediction, Weibull, and FMEA

Markov Analysis

- **Visual diagramming tool for analyzing state-based non-traditional systems including load-sharing and degraded-state scenarios**
- Over 35 calculation results

Life Cycle Cost (LCC) Analysis

- Compare design cost alternatives over specified time intervals to generate Net Present Value
- Receives global calculation results and variables from Reliability Prediction, RBD, OpSim, Maintainability

Human Factors Risk Analysis

- Process FMEA module incorporating errors attributed to human factors
- Developed concurrently with NASA's Office of Safety and Mission Assurance
- Wizard-driven format including human actions, errors and performance-shaping factor libraries

FRACAS – Failure Reporting Analysis and Corrective Action System

- Highly-flexible commercial off-the-shelf (COTS) tool for tracking and trending failure and non-conformity incidents configurable to your process flow
- User-definable data entry and analysis forms, workflow and data fields
- Engineering and management-level graphing and reporting
- Corporate and Enterprise editions
    - Global implementations
    - Role-based administration
    - Web interfaces
    - Automatic email notification base on user-defined conditions
- Integrate with other data sources via one-time or scheduled Import/Export and custom connectors
- Predefined and extremely customizable queries and calculations
- Integrated with Reliability Prediction, FMEA, Maintainability, and Weibull

Weibull Analysis

- Failure data analysis supports reliability growth and common failure distributions
- Establishes best-fit distribution on even small data sets
- Data sets can be generated in Relex FRACAS and dynamically linked to Reliability Prediction and RBD

IDAS Software Modules - Description

Search Technology's TechOASIS (http://www.thevantagepoint.com)

- US Government version is called TechOASIS; the commercial version is called VantagePoint.
- A powerful text-mining tool used for the discovery and extraction of knowledge from text based data sources.
- Supports hundreds of data sources
    - Many built-in import filters support major online data sources
    - Capability to develop custom import filters for almost unlimited adaptability
    - Built in MS Excel import capability
- Helps analysts determine relationships and critical patterns within text based data.
- Built-in tools assist analyst with data cleanup which provides for enhanced results.
- Supports scripting so that repetitive tasks can be defined and automated.
- Application has been used by large and small companies, government agencies, and academic institutions.
- Application has been utilized to perform varied tasks including technical intelligence, patent analysis, and technology management on a world wide basis.

ARINC's Raptor (http://www.arinc.com/products/raptor/index.html)

- A powerful reliability-block-diagram (RBD) tool that simulates operations analysis with an emphasis on availability, a probability measure that is a function of reliability (up time) and maintainability (down time).
- Characterizes the system's cost, reliability, and capacity, and can highlight capacity bottlenecks, high failure-rate components, and resource hogs that are driving up the cost of your operations.
- Provides 18 failure and repair probability density functions (pdf) to analyze system reliability (availability if the system is repairable), logistics constraints, preventive maintenance, dependency, standby, weak links, capacity, mission phasing, and cost.
- In relation to the Relex software on the KSC network, the Raptor software provides an additional capability in success space just as INL's SAPHIRE software provides an additional capability in failure space.
- KSC S&MA Integration (Tim Adams, SA-G2, 321-867-2267, tim.adams@nasa.gov) has Raptor and has received training. Raptor is not available on the KSC network.

INL's SAPHIRE (https://saphire.inl.gov)

- A premier probabilistic risk assessment (PRA) tool.
- Endorsed by NASA.
- IDAS is advocating and facilitating the communications for the capability for fault-tree files to be exchanged between Relex and SAPHIRE.
- For more information of SAPHIRE, contact KSC S&MA Integration (Tim Adams, SA-G2, 321-867-2267, tim.adams@nasa.gov) or NASA Office of Safety & Mission Assurance (Homayoon Dezfuli, Code Q, 202 358-2174, hdezfuli@nasa.gov).